

What is claimed is:

1 1. A method of providing reliability to an interconnect fabric for
2 communication among a set of nodes, the method comprising:
3 partitioning ports associated with each node into a first set of
4 ports and a second set of ports;
5 forming a primary interconnect fabric among the first set of ports
6 in response to a set of flow requirements; and
7 forming a backup interconnect fabric among the second set of
8 ports wherein the backup interconnect fabric carries a portion of
9 communications carried by the primary fabric so as to protect against
10 occurrence of a failure in the primary fabric.

1 2. The method according to claim 1, wherein said forming the
2 backup interconnect fabric comprises generating arrangements of flow
3 sets in response to the flow requirements, determining feasibility of
4 merging pairs of candidate flow sets and merging a pair of the flow sets.

1 3. The method according to claim 2, wherein said merging the pair
2 of the flow sets alleviates at least one port violation with respect to the
3 second set of ports.

1 4. The method according to claim 1, wherein said forming the
2 backup interconnect fabric comprises determining feasibility of merging
3 candidate flow sets based on a sum of flow requirements in the
4 candidate flow sets that are interrupted by a single failure in the primary
5 interconnect fabric.

1 5. The method according to claim 1, wherein said forming the
2 backup interconnect fabric comprises determining feasibility based on a

3 highest sum of flow requirements in the candidate flow sets that are
4 interrupted by different failures in the primary interconnect fabric.

1 6. The method according to claim 1, wherein said set of nodes
2 includes source nodes and terminal nodes.

1 7. The method according to claim 1, wherein each node is
2 associated with at least two ports.

1 8. The method according to claim 1, said partitioning further
2 comprising partitioning the ports associated with each node into a
3 number of additional sets of ports.

1 9. The method according to claim 5, further comprising forming
2 additional interconnect fabrics among the additional sets of ports.

1 10. The method according to claim 1, wherein the second set of ports
2 includes one port for each node.

1 11. A method of providing reliability to an interconnect fabric for
2 communication among a set of nodes, the method comprising:
3 identifying one or more failure modes in a primary interconnect
4 fabric, wherein the primary interconnect fabric carries communications
5 among the set of nodes via a first set of ports of the nodes; and
6 forming a backup interconnect fabric among a second set of ports
7 of the nodes for carrying a portion of the communications of the primary
8 fabric so as to protect against occurrence of any single one of the failure
9 modes of the primary fabric.

1 12. The method according to claim 11, wherein said forming the
2 backup interconnect fabric comprises generating arrangements of flow

3 sets in response to the flow requirements, determining feasibility of
4 merging pairs of candidate flow sets and merging a pair of the flow sets.

1 13. The method according to claim 12, wherein said merging the pair
2 of the flow sets alleviates at least one port violation with respect to the
3 second set of ports.

1 14. The method according to claim 10, wherein said forming the
2 backup interconnect fabric comprises determining feasibility of merging
3 candidate flow sets based on a sum of flow requirements in the
4 candidate flow sets in the primary interconnect fabric that are
5 interrupted by occurrence of a single failure mode in the primary
6 interconnect fabric.

1 15. The method according to claim 10, wherein said forming the
2 backup interconnect fabric comprises determining feasibility of merging
3 candidate flow sets based on a highest sum of flow requirements in the
4 candidate flow sets in the primary interconnect fabric that are
5 interrupted by occurrence of different failure modes in the primary
6 interconnect fabric.

1 16. The method according to claim 11, wherein said set of nodes
2 includes source nodes and terminal nodes.

1 17. The method according to claim 11, wherein each node is
2 associated with at least two ports.

1 18. The method according to claim 11, said partitioning further
2 comprising partitioning the ports associated with each node into a
3 number of additional sets of ports.

1 19. The method according to claim 15, further comprising forming
2 additional interconnect fabrics among the additional sets of ports.

1 20. The method according to claim 11, wherein the second set of
2 ports includes one port for each node.

1 21. A system for providing reliability to a design for an interconnect
2 fabric for communication between a set of nodes, the system
3 comprising:

4 a set of design information including a set of flow requirements
5 for the interconnect fabric; and

6 a fabric design tool that generates a primary design for the
7 interconnect fabric among of first set of ports of the nodes, the primary
8 design being in response to the flow requirements, and that generates a
9 backup design for the interconnect fabric among a second set of ports
10 for the nodes wherein the backup design carries a portion of
11 communications carried by the primary fabric so as to protect against
12 occurrence of any single one of failure modes of the primary fabric.

1 22. The system according to claim 21, wherein said fabric design tool
2 generates arrangements of flow sets in response to the flow
3 requirements, determines feasibility of merging pairs of candidate flow
4 sets and merges a pair of the flow sets.

1 23. The system according to claim 22, wherein said fabric design tool
2 alleviates at least one port violation with respect to the first or second set
3 of ports.

1 24. The system according to claim 21, wherein said fabric design tool
2 determines feasibility of merging candidate flow sets based on a sum of

3 flow requirements in the candidate flow sets that are interrupted by a
4 single failure in the primary interconnect fabric.

1 25. The system according to claim 21, wherein said fabric design tool
2 determines feasibility of merging candidate flow sets based on a highest
3 sum of flow requirements in the candidate flow sets that are interrupted
4 by different failures in the primary interconnect fabric.

1 26. The system according to claim 21, wherein said set of nodes
2 includes source nodes and terminal nodes.

1 27. The system according to claim 21, wherein each node is
2 associated with at least two ports.

1 28. The system according to claim 21, wherein said fabric design tool
2 further partitions the ports associated with each node into a number of
3 additional sets of ports.

1 29. The system according to claim 28, wherein said fabric design tool
2 forms additional interconnect fabrics among the additional sets of ports.

1 30. The system according to claim 21, wherein the second set of
2 ports includes one port for each node.